## REMARKS

Claims 1-16 and 21-22 are pending. Claims 17-20 have been canceled. Support for new claims 21-22 can be found in the original claims. No new matter has been added by way of the above-amendment.

### *[I] Prior Art Based Issues*

The following rejections are pending:

1) Claims 1-2, 4-5, 8 and 10-11 are rejected under 35 U.S.C. § 102(e) as being anticipated by Ku et al. (U.S. Patent Publication 2004/0209432);

2) Claims 6-7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Ku et al. (U.S. Patent Publication 2004/0209432); and

3) Claim 9 is rejected under 35 U.S.C § 103(a) as being unpatentable over Ku et al. (U.S. Patent Publication 2004/0209432) in view of Shah et al. (U.S. Patent 6,509,094).

Applicants respectfully traverse all of the rejections. The following sections are titled by claim numbers. The arguments for patentability in each section relate to the claim numbers in each title.

### *[I-A] Claims 1, 2, 4-8, 10 and 11:*

Applicants respectfully submit that there is no basis for the Examiner to reject the instant claims based on the patent by Ku et al. As is clearly stated in their patent, the objective of their invention is to reactivate dopants that were deactivated during a silicide blocking layer formation process (i.e., BLK process, which is typically performed prior to a silicide formation process) by performing post-BLK annealing (but again prior to a silicide formation process). It is important to note that the post-BLK process is a generic process that is applicable to any kind of silicide processes in which a BLK process is involved. In other words, Ku's invention is not just for resolving problems particularly related to the nickel silicide process. In contrast, the instant invention is specifically designed to overcome those materials and processing issues that are

particularly related to a nickel silicide formation process, more specifically thermal stability and sensitivity to interfacial oxide.

Accordingly, Ku et al. fail to teach or fairly suggest the instant process for forming a nickel silicide product having thermal stability and sensitivity to interfacial oxide as presently claimed. As such, withdrawal of the rejection is respectfully requested.

***[I-B] Instant Claim 2***

Claim 2 is further distinguished from the cited references, since claim 2 requires that the alloy contains platinum and/or palladium.

In Ku et al, it is stated that the alloying metals should meet two basic requirements which are:

(a) "The alloying metal selected should also have a silicidation temperature in excess of that necessary to form nickel silicide." (see 0012); and

(b) "When using a nickel alloy, particularly a nickel-tantalum alloy, the particular time and temperature combination selected should preferably be sufficient to produce a two-layered nickel silicide structure in which the majority of the nickel is present in the lower layer as NiSi and the majority of the alloying metal has been segregated into the upper layer." (see 0016).

Applicants note that these requirements hold true for Ta, but not for Pt. This is because: (1) the minimum formation temperature of PtSi is actually even lower than that for NiSi (250°C for PtSi vs. 300°C for NiSi); and (2) NiSi and PtSi can form an ideal solid solution. Therefore, there is no segregation of Pt in the upper layer. Thus, the artisan would not be motivated to use Pt (same for Pd), since Pt or Pd is not the right metal to select as the alloying metal for the nickel silicide process, if the artisan intends to make a two layered nickel silicide structure as required by Ku et al.

Accordingly, Ku et al. implicitly teach away from using platinum and/or palladium as is required by instant claim 2.

***[I-C] Instant Claim 2 and New Claim 22***

Claims 2 and 22 are further distinguished from the cited references, since claim 2 requires that the alloy contains platinum and/or palladium and claim 22 requires that the alloy contains titanium.

Although, it is mentioned in Ku's patent that the addition of foreign metals (such as Ta, Pt, Pd....) can suppress NiSi-to-$NiSi_2$ transition and also NiSi film agglomeration, there is no mention of the role of these metals in reducing interfacial oxide for a Ni-Si reaction to proceed. The present process allows two technical objectives to be accomplished concurrently, i.e., enhancing thermal stability of NiSi by Pt incorporation and, at the same time, effectively reducing interfacial oxide (if present) by the presence of Ti in the NiPt(x)Ti(y) alloy film. In this way, the instant process not only improves the performance of NiSi silicide film, but also increases the manufacturing yield.

Furthermore, in Ku et al's patent, Ti is not included in the list of metals that can be incorporated into Ni as a foreign element (either in the binary or ternary Ni alloys), which means that it is impossible to fabricate a NiPt(x)Ti(y) ternary alloy film from the metals listed in their patent as is required in instant claim 22.

Accordingly, claims 2 and 22 are further distinguished from the cited references, since claim 2 requires that the alloy contains platinum and/or palladium and claim 22 requires that the alloy contains titanium.

***[I-D] Instant Claim 9***

Claim 9 further defines the method by specifying that the alloy consists of $Ni_{1-x-y}\ Ti_xPt_y$ wherein $0.25 \geq x \geq 0.02$ and $0.25 \geq y \geq 0.02$. In rejecting claim 9, the Examiner has combined Ku et al. and Shah et al. However, Applicants respectfully submit that the skilled artisan would not look to Shah et al. to modify the teachings of Ku et al., since the disclosures of Shah et al and Ku et al. are directed to different technologies. Shah et al. relate to shape-memory materials

whereas Ku et al. describe the formation of nickel silicide layers for use in the fabrication of semiconductors.

MPEP 2143.01 instructs that the analysis under 35 USC 103 for obviousness based on a combination of references requires that one skilled in the art would look to the secondary reference(s) to modify the primary reference. A relevant case, *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992), is discussed at MPEP 2143.01. In *In re Jones*, the claimed invention was the 2-(2'-aminoethoxy) ethanol salt of dicamba, a compound with herbicidal activity. The primary reference disclosed *inter alia* the substituted ammonium salts of dicamba as herbicides, however the reference did not specifically teach the claimed salt. Secondary references teaching the amine portion of the salt were directed to shampoo additives and a byproduct of the production of morpholine. The court found there was no suggestion to combine these references to arrive at the claimed invention.

In a similar fashion to *In re Jones*, the skilled artisan would not be motivated to look to the teachings of Shah et al. (relating to shape memory materials) to modify the teachings of Ku et al. (relating to semiconductors). Accordingly, instant claim 9 is patentable over the cited references.

***[I-E] New Instant Claim 21***

Applicants respectfully submit that new claim 21 is patentable over the teachings of the cited references, since Ku et al. do not teach or fairly suggest a method of fabricating a nickel silicide layer wherein a) the substrate comprises silicon and silicon oxide; b) one of the components in the three component alloy is at least one metal selected from the group consisting of titanium, zirconium and hafnium; and c) that the tantalum, zirconium or hafnium reacts with the silicon oxide.

***[III] Claim 3***

The Examiner is thanked for indicating that claim 3 is allowable, see page 5, first full paragraph of the outstanding Office Action.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq. Reg. No. 43,575 at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By _____

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